

Application No.: 10/035,186

Docket No.: 21806-00146-US

REMARKS/ARGUMENTS

Bearing in mind the comments in the Official Action and the amendments and remarks presented herein, the application is believed to be in condition for allowance. An early indication of the same would be appreciated.

Status of Claims

Claims 14-29 remain pending in this application. Claims 14 and 25 are independent. Claims 17, 18, and 24-29 were withdrawn from consideration, as being drawn to the non-elected species. Claim 14 has been amended, and claim 15 has been canceled by this amendment.

Indefiniteness

Withdrawal of the rejection of claims 14-16 and 19-23 under 35 U.S.C. §112, second paragraph, as being indefinite, is requested. Claim 14 has been amended.

The Official Action does not state with specificity which portion(s) of the claims are considered to be indefinite, but merely indicates that the specifically stated ground of rejection is that "[i]t is not clear what all the claimed steps are and it is not clear how they would be implemented to produce the desired results." Applicants respectfully traverse this rejection, as the claimed steps are believed to be clear, for the reasons discussed below.

The second paragraph of 35 U.S.C. §112 merely requires that an applicant set out and circumscribe a particular area with a reasonable degree of precision and particularity such that the metes and bounds of the claimed invention are reasonably set forth.¹

It appears that the Official Action has confused the broadness of the claim recitations with indefiniteness. The mere fact that a claim is broad does not make it indefinite. The scope of a claim is definite when each of the limitations recited therein is definite.² However, it is now

¹ *Ex parte Head*, 214 USPQ 551, 552 (PTO Bd. App. 1981).

² *In re Goffe*, 526 F.2d 1393, 188 USPQ 131 (CCPA 1975).

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well settled that a claim need not describe the invention, such description being provided by the specification's disclosure section.

Original claim 14 claims a method which includes "providing an external electrical path...", and "...sending at least one signal through the external electrical path." Notwithstanding these clear limitations and the above-cited case law requirements relating to assertions of indefiniteness under §112, second paragraph, and the belief that the original claims clearly meet these requirements, independent claim 14 has been amended to modify the recitations defining the claimed invention, including incorporation of the subject matter of dependent claim 15.

Discussion of the embodiment read on by claim 14 may be found, for example, at least at page 10, line 6 through page 11, line 22, and Figs. 3 and 4. Reconsideration and allowance of claim 14 and dependent claims 16 and 19-23 are requested.

Anticipation by Littlebury et al.

Withdrawal of the rejection of claims 14, 16, 19, 22, and 23 under 35 U.S.C. §102(b) as being anticipated by Littlebury et al. (US 4,968,931) is requested.

Applicant notes that anticipation requires the disclosure, in a prior art reference, of each and every limitation as set forth in the claims.³ There must be no difference between the claimed invention and reference disclosure for an anticipation rejection under 35 U.S.C. §102.⁴ To properly anticipate a claim, the reference must teach every element of the claim.⁵ "A claim is anticipated only if each and every element as set forth in the claim is found, either expressly or inherently described, in a single prior art reference".⁶ "The identical invention must be shown in

³ *Titanium Metals Corp. v. Banner*, 227 USPQ 773 (Fed. Cir. 1985).

⁴ *Scripps Clinic and Research Foundation v. Genentech, Inc.*, 18 USPQ2d 1001 (Fed. Cir. 1991).

⁵ See MPEP § 2131.

⁶ *Verdegaal Bros. v. Union Oil Co. of Calif.*, 2 USPQ2d 1051, 1053 (Fed. Cir. 1987).

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as complete detail as is contained in the ...claim.”⁷ In determining anticipation, no claim limitation may be ignored.⁸

Littlebury et al. clearly does disclose all the limitations of independent claim 14, particularly as amended. For example, Littlebury et al. does not disclose a method for testing external C4 connections to digital semiconductor devices at the wafer level, which includes, among other features, “providing an external electrical path via a thin film interposer probe between a selected subset of external C4 connections on the digital semiconductor devices; and carrying out the testing...wherein the testing comprises at least one of a boundary scan and an input/output wrap test”, as recited in independent claim 14.

As is known from the Specification, and as a person having skill in the art would appreciate, boundary scan and input/output wrap techniques specifically avoid contacting each of the contacts of the device under test, because of the multiple thousands of C4 interconnects present on the chip. As discussed in the Specification, the present application is directed to structures and methods that are suitable for a reduced pin-count approach for testing within the field of chips using C4 interconnect technology. Further, as for the technical problem solved by the present application, the intent of Applicants' disclosure is to address the problems associated with the I/O wrap test methodology, and to provide a means of testing I/O circuits at very high frequencies by providing a short path between pairs of I/O or C4 pads.

Boundary scan and input/output wrap techniques, as recited, favorably use reduced pin-count methodologies, and avoid having to contact each of the plurality of C4 connections on the chip during a testing operation.

In contrast, Littlebury et al. is directed to a method of burning in integrated circuits on a semiconductor wafer that uses a flexible, inflatable membrane probe coupled to *each* of the plurality of contact pads on the wafer. Littlebury et al. exercises *all* the integrated circuits on the wafer in parallel, for a predetermined period of time.

⁷ *Richardson v. Suzuki Motor Co.*, 9 USPQ2d 1913, 1920 (Fed. Cir. 1989).

⁸ *Pac-Tex, Inc. v. Amerace Corp.*, 14 USPQ2d 187 (Fed. Cir. 1990).

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In contrast, the present application, in one embodiment, is directed to a method for testing, at the wafer level, only a subset of the total number of the external C4 connections to semiconductor devices, wherein the test method includes boundary scan and input/output wrap test techniques.

Accordingly, since the applied art does not disclose all the claimed limitations, reconsideration and allowance of claim 14 is requested. Further, as dependent claims 16-29 variously and ultimately depend from allowable claim 14, allowance of these claims is also solicited.

Unpatentability over Littlebury et al. in View of Thatcher et al.

Withdrawal of the rejection of claim 15 under 35 U.S.C. §103(a) as being unpatentable over Littlebury et al. in view of Thatcher et al. (US 5,968,191) is requested. Claim 15 has been canceled, thus rendering its rejection moot.

The subject matter of dependent claim 15 has been amended into independent claim 14. In order to establish a clear record, Applicants point out that Littlebury et al. teaches against the recitation of independent claim 14 which recites providing an external electrical path via a thin film interposer probe between *a selected subset* of external C4 connections on the digital semiconductor devices. Littlebury et al. exercises *all* the integrated circuits on the wafer in parallel, for a predetermined period of time, thus teaching against at least one aspect of the claimed invention. Thatcher et al. is offered by the Examiner as teaching boundary scan or wrap testing as recited in dependent claim 15.

Applicants further point out that Thatcher et al. is directed to testing of analog integrated circuits operating in a mixed signal environment, which includes selectively connecting components to an analog test bus. Therefore, Applicants submit that, even if the combination suggested by the Examiner included all the claimed limitations, a person with skill in the art would not be motivated to incorporate the analog teachings of Thatcher et al. with Littlebury et al.

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Unpatentability over Littlebury et al. in View of Nakata et al.

Withdrawal of the rejection of claims 20-21 under 35 U.S.C. §103(a) as being unpatentable over Littlebury et al. in view of Nakata et al. (US 6,323,663) is requested. These references are submitted as being combinable only by the use of impermissible hindsight, as each of the references teach away from at least one aspect of the invention claimed in independent claim 14, from which these claims depend.

At the outset, Applicant notes that, to establish a *prima facie* case of obviousness, three basic criteria must be met. First, there must be some suggestion or motivation, either in the references themselves or in the knowledge generally available to one of ordinary skill in the art, to modify the reference or to combine reference teachings. Second, there must be a reasonable expectation of success. Finally, the prior art reference must teach or suggest all the claim limitations.⁹ Further, the teaching or suggestion to make the claimed combination and the reasonable expectation of success must both be found in the prior art, not in applicant's disclosure.¹⁰

An essential evidentiary component of an obviousness rejection is a teaching or suggestion or motivation to combine the prior art references.¹¹ Combining prior art references without evidence of a suggestion, teaching or motivation simply takes the inventors' disclosure as a blueprint for piecing together the prior art to defeat patentability – the essence of hindsight.¹²

"There are three possible sources for a motivation to combine references: the nature of the problem to be solved, the teachings of the prior art, and the knowledge of persons of ordinary skill in the art."¹³ Further with regard to the level of skill of practitioners in the art, there is nothing in the statutes or the case law which makes "that which is within the capabilities of one

⁹ See MPEP §2143.

¹⁰ *In re Vaack*, 947 F.2d 488, 20 USPQ2d 1438 (Fed. Cir. 1991) and See MPEP §2143.

¹¹ *C.R. Bard, Inc. v. M3 Systems, Inc.*, 48 USPQ2d 1225 (Fed. Cir. 1998)

¹² *Interconnect Planning Corp. v. Feil*, 227 USPQ 543 (Fed. Cir. 1985)

¹³ See MPEP §2143.01, citing *In re Rouffet*, 149 F.3d, 1350, 1357, 47 USPQ2d 1453, 1457-8 (Fed. Cir. 1998).

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skilled in the art" synonymous with obviousness.¹⁴ The level of skill in the art cannot be relied upon to provide the suggestion to combine references.¹⁵

Applicants submit that, not only does Littlebury et al. teach away from the claim recitation in independent claim 14 with respect to exercising *all* the integrated circuits on the wafer in parallel, Nakata et al. also teach away from the invention recited in independent claim 14, as amended.

Nakata et al. address the problem of wafer burn-in, and proposes a wafer contacting package that can be used as a screen test, and in a burn-in environment. For example, Nakata et al. is directed to a method and apparatus for connecting IC terminals of a semiconductor wafer with probe terminals. The method and apparatus of Nakata et al. account for different thermal stresses and thermal expansion characteristics between the prober and device to be tested. A retainer board and probe sheet have an elastic member interposed therebetween, and are brought into such a close relationship that *each* integrated circuit terminal of the semiconductor wafer held by the retainer board is electrically connected to its corresponding probe terminal of the probe sheet.

Even assuming that Nakata et al. discloses the use of a thin film interface probe which may be somewhat similar in some respects to that recited in the pending claims, the technical problems addressed, and the solutions provided by various embodiments of the present application with respect to the different technical problem solved by Nakata et al. are significantly different. Further, Nakata et al. appears to test each terminal of the semiconductor device. Thus, Applicants submit that a person having skill in the art would not be motivated to modify Nakata et al. to teach or suggest Applicants' recited invention in the manner suggested by the Examiner.

Further, "[w]hen a person, having the references before him and not cognizant of applicant's disclosure, would not be informed that a problem (solved by applicant's claimed

¹⁴ *Ex parte Gerlach and Woerner*, 212 USPQ 471 (PTO Bd. App. 1980).

¹⁵ See MPEP §2143.01, citing *Al-Site Corp. v. VSI Int'l Inc.*, 50 USPQ2d 1161 (Fed. Cir. 1999).

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invention) ever existed, such references (which failed to recognize the problem) could not have suggested its solution. The references were thus improperly combined since there is no suggestion in either of them that they can be combined to produce the result obtained by the claimed invention.¹⁶ Thus, recognition of the problem to be solved is an important element in the determination of patentability.

Both Littlebury et al. and Nakata et al. fail to appreciate the problems associated with contacting each of a plurality of C4 interconnects and, in fact, these references continue the conventional approach of contacting each of the I/O contacts, in order to test each of the devices on the chip.

Thus, the suggested combination of Littlebury et al. and Nagata et al. teach away from the recitations of independent claim 14, from which dependent claims 20 and 21 variously and ultimately depend.

Thus, applicants submit that a person having skill in the art would not be motivated to modify Littlebury et al. to accomplish the digital testing techniques, e.g., boundary scan and input/output wrap techniques, as recited in independent claim 14, as amended. Accordingly, withdrawal of the unpatentability rejection over Littlebury et al. in combination with Nakata et al. is requested.

Rejoinder and allowance of previously withdrawn dependent claims 17, 18, and 24, depending from allowable claim 14, are requested.

In view of the above, each of the pending claims 14-24 in this application is believed to be in immediate condition for allowance. Accordingly, the Examiner is respectfully requested to withdraw the outstanding rejection of the claims and to pass this application to issue.

¹⁶ *In re Shaffer*, 229 F. 2d 476, 108 U.S.P.Q. 326, 329 (C.C.P.A. 1956).

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For any fees that may be due, including fees for extensions of time, please charge CBLH Deposit Account No. 22-0185, under Order No. 21806-00146-US from which the undersigned is authorized to draw.

Respectfully submitted,

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